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ORIGINAL ARTICLE

Comparison of environmental health status in primary schools in different districts of Isfahan city in 2008-2009

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Key words

Environment health • Primary schools • Isfahan city

Summary

Introduction. *Students spend at least 20% of their time in schools. Training, educating and the personality of these students depends on appropriate educational methods, proper physical space, and also favorable mental environment. Students are considered as a major human resources of any society and dealing with their health and promoting educational environment health is in fact a kind of investment for future. In this study we examined the status of environmental health status in primary school of different districts of Isfahan.*

Materials and methods. *This study was a descriptive-analytical study. The number of studied samples was 77 schools in Isfahan which were selected by regular randomized method. The tool used to gather data was a environmental health inquiry form for school environments, and consisted of two parts: the first part included common school specifications and the second part involved items dealing with desirability of various parts of schools.The above forms were filled out in 3 months by specialists in public health, evaluating the schools and interviewing the principals. Then, they were analyzed and a comparison was made between the results from various districts.*

Results. *76.6% of schools complied with the standards and 80.5% of classrooms were in desired conditions. Regarding the standards for building and classrooms, there was no significant difference between various districts. Hygiene services (water closets and basin) and drinking water were at desired level and there was no significant difference between various districts in this regard, however the district 1 was in undesired condition. Regarding collecting and disposing of rubbishes and trashes, 79% of schools were in desired condition and 49% of them had hygienic tuck-shops according to standards, but there was no significant difference between various districts.*

Conclusion. *The study showed that the status of environment health is at desired level in primary schools in Isfahan, but the health of tuck-shops should improve in schools and it needs more attention and interest from authorities of Ministry of Education and Ministry of Health and dedicating proper budgets to solve their health problems.*

Introduction

School is a typical social environment where the character of today kids is founded and managed by correct educational methods, proper physical space, and desired mental environment [1].

One of effective factors in new education is the architecture of school. The beautiful and luxuriant schools facilitate learning and present the esprit and youthfulness to the kids, whereas the dirty, dark, and lifeless schools result in the depressed and dull students and negative influence their learning rate and their youthfulness [2].

Based on studies in Yasuj city, the schools with old building consisted 60% of all and only 22% of classrooms in schools with old building were painted agreeably [3]. In Markazi province, at least 56.2% of schools were located in the vicinity of dangerous situation such as high ways, lath shops, welding workshops, and construction workshops [4]. It is obvious the influence of classrooms' conditions such as light, chairs and tables, doors and windows, and safety and sport facilities like the first aid and sport spaces, and trees and flowers on the students' health, and ignorance of the above needs may result in destructive effects [1].

According to the published statistics in 1990 in US, it occurred about 43% of accidents to students in schools, 17% in playgrounds and 20% in the building of school [5].

Hygiene services (water closets and basin) are of variables affecting the students' health. The students' health is endangered by unsanitary water closets and basin and health providers not attending in schools. According to the researches, the water closets in schools were in sanitary condition in Shahr Kord city by only 4.82 % [6] and more than 50% of them were in unsanitary condition in Yasuj city [3] and in a research in Mazandaran city, only 13.7% of health providers were present consciously in schools [7].

School are places in where the students pass 20% of their time [1], and they form a major part of our population (< 25%) [8], and dealing with their health and enhancing the hygiene in educational environment are considered as investments for future, because any ignorance in this regard leads to irrecoverable losses in society. Considering its importance and the fact that there are few researches about hygiene in schools in Isfahan, the aim of present study is to compare the status of environment health in primary schools in different districts in Isfahan.

Materials and methods

This descriptive-analytic study was performed on 77 public primary schools (girls and boys schools) in Isfahan in 2008. The schools were selected by regular randomized method.
To gather data, it was used a environment health inquiry form for school environments, which was prepared according to the health environment statute for schools ordered by Ministry of Health, Therapy and Medical Education (assistant of Health, environmental health and profession center) [9] (Appendix 1).
The forms consisted of two parts: the first part included common school specifications such as total number of students, kind of construction of the schools, total area, and number of shifts and the second part involved items dealing with desirability various parts of schools such as hygienic services, tuck-shops, classrooms, safety, collecting and disposing of rubbishes and trashes.
The above forms were filled out in 3 months by professionals in public health, evaluating the schools and interviewing the principals. Finally, the gathered data were analyzed by the software SPSS and chi-square.

Results

In the present study, the construction of schools was divided into three categories: old (> 15 yrs), new (< 15 yrs), and reinforced against earthquake. The results showed that there is a significant difference among the various districts ($p = 0.044$) and only 3.8% of schools were reinforced.
Regarding the classrooms, there was no significant difference among the various districts in terms of the painting of floor and ceiling, the location of blackboard, area of class, materials used in walls and floor ($p = 0.786$).
The hygiene of tuck-shops influences directly on the students' health in primary schools. In all districts, only 49.4% of tuck-shops were desirable and based on standards (Tab. I).
In the present study, all schools in 5 districts made use of tap water whose hygiene was confirmed by Ministry of Health.
There was no significant difference among the various districts, in terms of the drinking water and basin, but there was a significant difference among the various districts in terms of water closets ($p = 0.045$), so that the district 2 had most desirable one, and the districts 3and 5 had the most undesirable (Tab. II).
Regarding the safety in schools (including heating services, fire extinguishers, safe switches and outlets), there was no significant difference among the various districts ($p = 0.786$, $x^2 = 1.727$), however, the most desirable and the most undesirable ones were the district 2 the districts 1, respectively. Also 24.7% of schools had at least two escapes for emergency situations. In this regard, there was a significant difference among the various districts ($p = 0.000$).
In addition to the above issues, collecting and disposing of rubbishes and trashes was of importance in schools, because ignoring these factors causes the students to be infected by various diseases such as diarrhea. The results showed that there was no significant difference in this regard ($p = 0.194$, $x^2 = 6.069$), and he district 4 had the most desirable by 8.93% and the district 1 had the most undesirable by 7.64%.

Discussion

This study was done to compare the environment health status in primary schools in various districts in Isfahan. The results showed that 76.6% of schools had their constructions according to standards of environmental health. These results were congruent with those of other researches [4, 6, 10, 11]. But in Beigpoor's study in Kermanshah city, 3.89% of schools were used before in other ways [12]. By increasing the number of students and establishing nonprofit schools in Isfahan, it is expected that making use of such places will increase. But what is of the most importance is reinforcing these building against earthquake. In the present study, only 3.8% of schools were reinforced, and this issue requires more attention from authorities.
In the present study, 80.5% of schools had desirable classrooms in terms of health situation, which indicates

Tab. I. Distribution of school about tuck-shop, class status and school construction in different districts.

District		tuck-shop		class status		school construction		Total
		undesirable	desirable	undesirable	desirable	undesirable	desirable	
1	N	12	5	3	14	5	12	17
	p	70.6%	29.4%	17.6%	82.4%	29.4%	70.6%	100%
2	N	5	8	1	12	2	11	13
	p	38.5%	61.5%	7.7%	92.3%	5.4%	84.6%	100%
3	N	9	7	3	13	2	14	16
	p	56.3%	43.8%	18.8%	81.3%	12.5%	87.5%	100%
4	N	5	11	5	11	4	12	16
	p	31.3%	68.8%	31.3%	68.7%	25%	75%	100%
5	N	8	7	3	12	5	10	15
	p	53.3%	46.7%	20%	80%	33.3%	66.7%	100%
total	N	39	38	15	62	18	59	77
	p	50.6%	49.4%	19.5%	80.5%	23.4%	76.6%	100%
		$p = 0.190$ $\chi^2 = 6.129$		$p = 0.786$ $\chi^2 = 2.609$		$p = 0.266$ $\chi^2 = 2.720$		

N: number; p: percentage

Tab. II. Distribution of school about water closets, drinking water and basin, in different districts.

District		water closets		Drinking water		basin		Total
		undesirable	desirable	undesirable	desirable	undesirable	desirable	
1	N	3	14	2	15	3	14	17
	p	17.6%	82.4%	11.8%	88.2%	17.6%	82.4%	100%
2	N	0	13	3	10	0	13	13
	p	0%	100%	23.1%	76.9%	0%	100%	100%
3	N	1	15	3	13	2	14	16
	p	6.3%	93.8%	18.8%	81.3%	12.5%	87.5%	100%
4	N	2	14	1	15	1	15	16
	p	12.5%	87.5%	6.3%	93.8%	6.3%	93.8%	100%
5	N	1	14	2	13	0	15	15
	p	6.7%	93.3%	13.3%	86.7%	0%	100%	100%
total	N	7	70	11	66	6	71	77
	p	9.1%	90.9%	14.3%	85.7%	7.8%	92.2%	100%
		p = 0.510 χ^2 = 3.294		p = 0.731 χ^2 = 2.024		p = 0.266 χ^2 = 5.211		

paying attention to architecture of schools and its effect on students' learning and youthfulness.

Considering the Table II, and the results from researches in various regions in the country [3, 6, 10, 13], it can be indicated that the status of hygiene services is at desirable level in governmental schools in Isfahan. Regarding one of major principles of public health (i.e. supplying healthy drinking water), there is healthy tap water in 100% of schools in Isfahan, and this result is congruent with those of researches in Sanandaj city, Mazandaran city, and Yasuj city [3, 7, 10] and it indicates the country's interests in it, whereas in Caleb's study, only 50% of schools had drinking water supply [14].

The results showed in terms of tuck-shops that only 49.4% of schools had health tuck-shops. Sharifirad showed in his study in 2004 that only 33.6% of tuck-shops were in desirable situation. These results indicate a relative increase in health level of tuck-shops after 4 years, and this issue necessitates the training of the sellers in tuck-shops and executive guaranty in this field [15].

Isfahan situation is better than that of Tehran city in terms of safety [16], but only 24.7% of schools had at least two escapes. In this regard, it is congruent with that of Mazandaran city [7].

Therefore, it requires actions such as continuous supervising, training the students, the staff in schools, and the parents, attracting the contribution of people, and the cooperation between Ministry of Education and Ministry of Health to improve the undesirable situations.

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Appendix 1

Evaluation form of school health situation based on IRI national instructions. Rely on instructions (√); not rely on instructions (×); not existed (-)

Standard Description	Text materials regulations	Text materials regulations number	Match or mismatch with the regulations	Line
Observations and questions from school manager	Construction site must have appropriate distance and position (must not be adjacent to the path and environment polluting sources such as chemical factories or adjacent the cemetery, railroad, and…)	Clause 1		1
Observations and questions from school manager	School boards are must be at least 500 meters away from environmental pollutant sources	Remark 1		2
Expert opinion	School land area must be proportional to the number of students. (at least 6-8 square meters for each student)	Clause2		3
Based on Clause 5-13 must be estimated	Buffet health regulations must be in accordance with instruction 13 of eating, drinking, and makeup Material (health Buffet: A buffet is in the order of minimum conditions of 5-13 instruction clauses)	Remark 3		4
Documents control	All those who involved in preparation and selling of food in schools should be have Certificate of courses of intensive public health classes	Remark 3		5
Documents control	Buffet operators must have a valid medical examination card	Remark 3		6
Observations	All patients required general personal hygiene and cleaning their work place and to consider instructions from health inspectors	Remark 3		7
Observations	All those who are involved in distribution of food should be dressed in clean and bright gowns	Remark 3		8
Observations	Buffet floor, walls and ceilings must be robust, seamless, and washable with bright color, the coverage of the wall as high as 1.3 meter must be of bright colored tiles or stone, and windows and shelves and window of Buffet desk must be made of robust, healthy materials, with no cracking and fracture, and must be clean and washable	Remark 3		9
Observations	All perishable foods must be kept refrigerated or cold storage and supply of expired date food must be avoided	Remark 3		10
Observations	Using non-standard materials, including non-health and recycled paper and plastic bags for wrapping and food packaging is prohibited	Remark 3		11
Observations and Documents control	Quality of food supply and distribution of standards must be based on announcements and guidelines of Ministry of Health and Medical Education of IRI	Remark 3		12
Observations	Suitable locations for storage of milk at school are available	Remark 3		13
Observations	Place for praying is suitable. (appropriate environment, keeping worshipers shoes, proper floor coverage)	Remark 3		14
Documents control	Map of the school building and other related areas comply with health standards and designed to authorities	Clause 3		15
Observations	Classroom walls should be completely dry and smooth and seamless, and stone are used for wall at least as high as the window	Clause 4		16
Observations	Part of the school and class has been stained by washable color.	Clause 4		17
Observations	Floor of classes, corridors, stairs should be robust, flat, washable and not slippery	Clause 5		18
Observations	Classes roof are seamless and have smooth ceilings with bright color	Clause 6		19
Measurement(at least in 2 classes)	Class boards installed in appropriate place and must not exceed 2.2 meter from first row of students	Clause 7		20
Observations and question from students	Color of boards must be good and not shiny that prevent reflection of light	Clause 7		21
Measurement(at least in 2 classes)	Classroom space for each student is considered at least 1.25 square meter surface	Clause 8		22
Measurement and question from school manager	Class size is appropriate. (8 meters long and seven meters wide and three meters high up to class)	Clause 8		23

(continues)

Observations	Student's foot must have enough contact with floor while sitting on a chair	Clause 9	24
Observations	Relying on a chair while sitting in the back is appropriate	Clause 9	25
Observations	Bluff overlooking the stairs at school should not be slippery and is equipped with a suitable fence	Clause 10	26
Measurement	Maximum height of the stairs at school and a minimum width of 18 cm and 30 cm length and at least 1.3 in length	Clause 11	27
Observations	Windows overlooking the extracellular space, are equipped with a suitable wire mesh	Clause 13	28
Observations and questions	Insects and rodents in the school environment and their effects should not be seen	Clause 13	29
Documents control	Materials used to combat insects and rodents must be from companies licensed from the Ministry of Health	Clause 13	30
			31
Observations	Class of young students must be in the lower floors of the building	Clause 14	32
Observations	any classes associated with balcony and terrace is prohibited. (Even one sample of non compliance with regulations must be mentioned)	Clause 15	33
Questions from students and teacher	Workshops and assembly halls, and.... must have situation such that does not bother classrooms	Clause 16	34
Documents control	Water is consuming by school must rely on national standard of IRI (numbers 1011 and 1053) and must be approved by Health Department officials	Clause 19	35
	Water supply sources must be mentioned	Clause 12	36
Water sources control	If the school uses water tank, water tank type and material constraint is	Remark 2	37
Expert opinion and question from students and school manager	Volume of water used in the reservoir is enough to supply the number of students. (at least 15 liters a day for each student)	Remark 2	38
Expert opinion	Mug must have healthy conditions. (healthy mug: must have washable walls and floors, the proper slope and the bottom edge of the mug must be in the slop of sewage)	Remark 3	39
Observations and measurement	Milk mug height must be proportional to age of students between 75-100 cm above ground level	Remark 3	40
Observations	Mug must have safe valves	Remark 3	41
Observations and Expert opinion	Mention the number of sanitary drinking cup milk	Remark 3	42
Expert opinion	Mugs situations must be out of the toilets with a minimum distance of 15 meters	Remark 3	43
Expert opinion	Total water gorge is proportional to the number of students (each 45 students one mug of milk)	Remark 3	44
Expert opinion	Number of toilets is proportional to the number of students (one toilet per each40 persons)	Clause 20	45
Expert opinion	Wash stands number is proportional to the number of students (one per 60 people)	Clause 20	46
Expert opinion	Wash stands must have healthy conditions. (sanitary Wash stands: height of Wash stands must be 60-75 cm from ground level appropriate for students age, valve should be installed upper than the edge of the wash stand bowl)	Remark 1	47
Based on Clause 52, 53 must be estimated	Number of sanitary wash stands	Remark 1	48
Expert opinion	Toilets must have healthy condition (Toilet hygiene: toilet, which have at least this conditions: 1. have a collecting tank waste is connected to public sewer network; 2. have walls and ceilings and door; 3. toilet chamber have enough light and air to be ventilated; 4. pure sanitary tile, without fracture and must be washable; 5. the floor have steep to sewer and is washable; 6. 150 cm height washable walls; 7. access to washing water is required for)	Remark 1	49
Based on Clause 53, 54 must be estimated	Number of sanitary toilet	Remark 1	50

(continues)

Expert opinion	Mugs sewage disposal method shall be sanitary	Remark 1	51
Test and questions	Height of toilet is appropriate to age of students. (60-75 cm from ground)	Remark 2	52
Observation	Toilet must be equipped with liquid soap piping systems	Remark 3	53
Expert opinion	Wastewater disposal must be by sanitary method. (Well absorber - septic tank - sewage disposal system)	Clause 21	54
View and Question from student	Classes must have natural light(preferably twisted from left)	Clause 22	55
Observation	If you use artificial light especially at night classes, light must be 300-500 lux	Remark 1	56
Observation	Light of corridors must be 150-100 and for dressing room, the toilet and wash stands at least 100-50 luxurious must be considered	Remark 1	57
Question from student and teacher	the temperature must be 18 °- 21C in classrooms	Clause 23	58
Question from student and teacher	Humidity of class must be natural (60-50 percent). Humidity should not be smelled in the classroom environment	Clause 23	59
Question from student and teacher	Ventilation and air conditioning of class is suitable	Clause 23	60
Observation	Heating instruments should have standard logo and be healthy and safe	Clause 23	61
Question from student	Class atmosphere should be heated equally	Clause 23	62
Observation	Oil and gas reservoirs should be in appropriate location away from classrooms	Clause 23	63
Observation	Firefighting equipment and adequate number of suitable locations should exist. (1.5 m distance from the ground)	Clause 24	64
Observation	Fire extinguishing equipment should be charged with a valid date	Clause 24	65
Observation	Electrical cabinet, electrical outlet keys must be in a good shield	Clause 24	66
Observation	Each building must have at least two emergency escape routes and students must have easy access to it	Clause 24	67
Observation	Alarm for use in emergency conditions should exist	Clause 74	68
Observation	Place for emergency escape of students must be identified with special signs	Clause 24	69
Observation	Ashcan with door, stainless, with appropriate capacity and equipped with garbage bags must exist in all parts of the school. (In the rate of 75% and up)	Clause 25	70
View and questions from students	collection and disposal of garbage must be done daily and timely	Clause 25	71
Observation	Any pond in school is illicited	Clause 26	72
Observation	Laboratory walls must be made of resistant and washable materials	Clause 27	73
Observation	Laboratory floor must be made of washable and resistant materials and not slippery. Appropriate slope with the floor cleaner is mandatory	Clause 27	74
Observation	Laboratories and workshops must be equipped with liquid soap and toilet and hot and cold water	Remark 1	75
Observation	Laboratory ventilation system must be adequate to room size	Remark 2	76
Observation	Safety instructions in the laboratory must be installed in an appropriate place	Remark 3	77
Observation	Each school should have an equipped health care room	Clause 28	78
Measurement	For each student in each school.5 m^2 green space should be considered	Clause 30	79
Observation	School grounds must be made of good materials (asphalt or concrete and non-slippery floor).	Clause 31	80
Document Control	School has qualifications for construction based on Ministry of Health and Medical Education	Clause 33	81